Koehler, G. 1988. "Demographic Characteristics and Habitat Requirements of Lynx in North Central Washington." Final Report. Wildlife Research Institute and Idaho Cooperative Fish & Wildlife Research Unit, University of Idaho, Moscow, ID.

Koehler, G., J. Blakesley, & T. Koehler. 1990. "Marten Use of Successional Forest Stages During Winter in North Central Washington." Northwest Naturalist. 71:1-4.

Koehler, G., W. Moore, & A. Taylor. 1975. "Preserving the Pine Marten: Management Guidelines for Western Forests." Western Wildlands. Summer Issue.

Laufer, J. & P. Jenkins. 1989. "A Preliminary Study of Gray Wolf History and Status in the Region of the Cascade Mountains of Washington State." Final Report to the Washingtonn Department of Wildlife, Olympia, WA.

Lehmkuhl, J., & L. Ruggiero. 1992. "Forest Fragmentation in the Pacific Northwest and its Potential Impacts on Wildlife." in Ruggiero, et al, 1991.

Leidholt, B., D. Hibbs, & W. McComb. 1992. Beaver Dam Locations and Their Effects on Distribution and Abundance of Coho Salmon Fry in Two Coastal Oregon Streams. Northwest Science. 66;218-223.

Lichatowich, J. 1999. Salmon Without Rivers: A History of the Pacific Salmon Crisis. Island Press.

Lynch, J.A, E.S. Corbett, and K. Mussallem. 1985. Best Management Practices for Controlling Nonpoint Source Pollution on Forested Watersheds. Journal of Soil and Water Conservation. 40:164-167.

Marcot, Bruce. 1997. "Biodiversity of Old Forests of the West: A Lesson From Our Elders." in Kohm et al. (1997).

Marshall, D. 1991. "Status of the Black Backed Woodpecker in Oregon and Washington." Portland Audubon Society.

Mattson, D. & R. Knight. 1991. "Implications of Short Rotation (70-120 Year) Timber Management for Yellowstone Grizzly Bears." Interagency Grizzly Bear Study Team Report. USDI National Park Service.

McComb, William *et al.* 1993. "Douglas Fir Forests: Managing for Timber and Mature Forest Habitat." Journal of Forestry. 91;12.

McDade, M.H., F.J. Swanson, W.A. McKee, J.F. Franklin, and J. Van Sickle. 1990. Source Distances For Coarse Woody Debris Entering Small Streams in Western Oregon and Washington. Canadian Journal of Forest Research. 20:326-330.

McDade, M. 1988. The Source Area for Coarse Woody Debris in Small Streams in Western Oregon and Washington. Thesis. Oregon State University.

McLelland, B. & D. Shackleton. 1988. "Grizzly Bears and Resource Extraction Industries: Effects of Roads on Behavior, Habitat Use, and Demography." Journal of Applied Ecology. 25:451-460.

McLelland, B. 1979. "The Pileated Woodpecker in Forests of the Northern Rocky Mountains." in J. Dickson, ed., The Role of Insectivorous Birds in Forest Ecosystems. Academic Press, NY.

Medin, D. & W. Clary. 1991. Small Mammals of a Beaver Pond Ecosystem and Adjacent Riparian Habitat in Idaho. Research Paper INT-445. USDA Forest Service.

Mellen, T., E. Meslow, & R. Mannan. 1992. "Summertime Home Range and Habitat Use of Pileated Woodpeckers in Western Oregon." Journal of Wildlife Management. 56(1):96-103.

Moore, E. 1998. Letter of January 9, 1998, to Rick Applegate, NMFS, Regarding EPA's Assessment and General Comments on NMFS' Draft Proposal to Improve Oregon Forest Practices. US Environmental Protection Agency, Seattle, WA.

Montana Bull Trout Scientific Group (MBTSG). 1998. The relationship between land management activities and habitat requirements of bull trout. Montana Bull Trout Restoration Team, Helena, MT

Montgomery, D. in preparation. Bedrock and alluvial streams. Ongoing research for CMER Committee of the Washington State Timber Fish Wildlife Process.

Moyle, P., et al. 1994. Protection of Aquatic Biodiversity in California: A Five Tiered Approach. Fisheries. 119;2.

Murphy, M. 1995. Forestry Impacts on Freshwater Habitat of Anadromous Salmonids in the Pacific Northwest and Alaska -- Requirements for Protection and Restoration. NOAA Coastal Ocean Program, Decision Analysis Series #7. US Dept. of Commerce, NOAA, Coastal Ocean Office, Silver Springs, MD.

Nelson, C., ed. 1995. Key Elements for Ecological Planning: Management Principles, Recommendations, and Guidelines for Federal Lands East of the Cascade Crest in Oregon and Washington. A Report to the Interior Columbia Basin Ecosystem Management Project. Columbia River Bioregion Campaign, Science Working Group, Walla Walla, WA.

Nelson, S. & T. Hamer. 1995. Nesting Biology and Behavior of the Marbled Murrelet. in Ralph, C., G. Hunt, & M. Raphael, et al, eds. Ecology and Conservation of the Marbled Murrelet. Gen Tech Rept PSW-GTR-152. USDA Forest Service.

Nelson, S. & A. Wilson. 1997. Marbled Murrelet Habitat Characteristics on State Lands in Western Oregon. 1996 Annual Report. Cooperative Wildlife Research Unit, Oregon State University.

NMFS. 1999. Draft Generic Salmonid Conservation Measures for Forestry Activities for a Short Term HCP in California. National Marine Fisheries Service. July 1999.

NMFS. 1998. A Draft Proposal Concerning Oregon Forest Practices. Submitted to the Oregon Board of Forestry Memorandum of Agreement Advisory Committee and the Office of the Governor. National Marine Fisheries Service, Northwest Region, Portland, OR.

NMFS. 1997. Draft Coho Salmon Take Avoidance Guidelines for Forestry Activities in California. June 25, 1997. National Marine Fisheries Service.

NMFS. 1996. Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale. Environmental & Technical Services Div., Habitat Conservation Branch, National Marine Fisheries Service.

NMFS. 1996b. Coastal Salmon Conservation: Working Guidance for Comprehensive Salmon Restoration Initiatives on the Pacific Coast. National Marine Fisheries Service, Portland, OR, and Santa Rosa, CA.

Noss, R. 1990. "Indicators for Monitoring Biodiversity." Conservation Biology. 4(4):355-3645.

Nussbaum, R., E. Brodie, & R. Storm. 1993. Amphibians and Reptiles of the Pacific Northwest. Uiniversity Press, University of Idaho, Moscow, ID.

O'Connell, M. 1988. "Occurrence of the Boreal Owl in Northeastern Washington." Proceedings of a Symposium on the Biology and Conservation of Northern Forest Owls. February, 1987, Winnipeg, Manitoba. Gen. Tech. Rept. RM-142. USDA Forest Service.

Olson, D. 1999. Survey Protocols for Amphibians Under the Survey and Manage Provisions of the Northwest Forest Plan. Gen Tech Rept. Pacific Northwest Research Station, USDA Forest Service.

Olson, D. 1995. Juvenile Salmonid Assemblages in Coastal Oregon Basins: Ecological Interactions and Diversity Patterns. Coastal Oregon Productivity Enhancement Program.

Olson, D. & W. Leonard. 1997. Amphibians Inventory and Monitoring: A Standardized Approach for the Pacific Northwest. In Olson, D., W. Leonard, & R. Bury, eds. 1997. Sampling Amphibians in Lenthic Habitats. Northwest Fauna. Society for Northwestern Vertebrate Ecology, Olympia, WA.

Olson, D., W. Leonard, & R. Bury, eds. 1997. Sampling Amphibians in Lenthic Habitats. Northwest Fauna. Society for Northwestern Vertebrate Ecology, Olympia, WA.

Pacific Seabird Group. 1996. Letter to Mike Spear, US Fish & Wildlife Service.

Peterson, N. 1982a. Immigration of Juvenive Coho Salmon into Riverine Ponds. Canadian Journal of Fisheries Aquatic Science. 39;1308-1310.

Peterson, N. 1982b. Population Characteristics of Juvenive Coho Salmon Overwintering in Riverine Ponds. Canadian Journal of Fisheries Aquatic Science. 39;1303-1307.

Pollock, M. & P. Kennard. 1998. A Low Risk Strategy for Preserving Riparian Buffers Needed to Protect and Restore Salmonid Habitat in Forested Watersheds of Washington State. 1,000 Years Institute, Bainbridge Island, WA.

Pollock, M. & G. Pess. 1998. The Current and Historical Influence of Beaver on Coho Smolt Production in the Stillaguamish River Basin. 10,000 Years Institute, Seattle, WA.

Powell, R. 1982. "The Fisher: Life History, Ecology, & Behavior." University of Minnesota Press, Minneapolis, MN.

PRC. 1996. Healing the Watershed: A Guide to the Restoration of Watersheds and Native Fish in the West. Pacific Rivers Council, Eugene, OR.

Quinn, J. & J. Karr. 1993. "Habitat Fragmentation and Global Change." in P. Kareiva, et al, eds, Biotic Interactions and Global Change. Sinaeur Associates, Sunderland, MD.

Ralph, C., G. Hunt, M. Raphael, & J. Piatt. 1995. Ecology and Conservation of the Marbled Murrelet. Gen Tech Rept PSW-GTR-152. USDA Forest Service.

Recovery plans for Federally-listed species.

Reel, S., L. Schassberger, & W. Ruediger. 1989. "Caring for Our Natural Community: Region 1 Threatened, Endangered, and Sensitive Species Program." Northern Region, USDA Forest Service, Missoula, MT.

Reeves, G., et al. 1995. A Disturbance-Based Ecosystem Approach to Maintaining and Restoring Freshwater Habitats of Evolutionary Significant Units of Anadromous Salmonids in the Pacific Northwest. American Fisheries Society Symposium 17:334-349.

Reid, L. 1999. "Keeley Report." Report to the California Assembly on Watershed Impacts and Restoration.

Reid, L. & R. Ziemer. 1999. Evaluating the Biological Significance of Intermittent Streams. Review Draft. Pacific Southwest Research Station, USDA Forest Service, Arcata, CA.

Reid, Leslie M. 1998. Cumulative watershed effects and watershed analysis. in Naiman, Robert J., and Robert E. Bilby, eds. River Ecology and Management: Lessons from the Pacific Coastal Ecoregion. Springer-Verlag, N.Y.

Reid, L. M. 1998. Forest roads, chronic turbidity, and salmon. EOS, Transactions, American Geophysical Union 79(45): F285.

Reid, L. M. (ed.). In review. Issues in watershed analysis. PSW General Technical Report. 1998.(ms)

Reid, L. M., T. Dunne, and J. Lewis. In review. Calculating average landslide frequency: a simplified method. Earth Surface Processes and Landforms. (submitted 6/28/98)

Reid, Leslie M., and Fredrick J. Swanson. In review. Sediment budgeting strategies for land management applications. Physical Geography. (submitted 9/29/98)

Reid, L. M., and R. R. Ziemer. In review. 2. Evaluating the biological significance of intermittent streams. In: L. M. Reid (ed.). Issues in watershed analysis. PSW General Technical Report. 1998. 12 p. (ms)

Reid, L. M., R. R. Ziemer, M. E. Smith, and C. Close. In review. 3. Evaluation of unstable lands for interagency watershed analysis. In: L. M. Reid (ed.). Issues in watershed analysis. PSW General Technical Report. 1998. 15 p. (ms)

Reid, L. M., R. R. Ziemer, and M. J. Furniss. In review. 4. What do we need to know about roads? In: L. M. Reid (ed.). Issues in watershed analysis. PSW General Technical Report. 1998. 17 p. (ms)

Reid, L. M., and R. R. Ziemer. In review. 5. Basin assessment and watershed analysis. In: L. M. Reid (ed.). Issues in watershed analysis. PSW General Technical Report. 1998. 16 p. (ms)

Reid, L. M. 1991. Research and cumulative watershed effects. Final Report to the California Department of Forestry and Fire Protection. 221 p.

Reid, Leslie M. 1998. Cumulative watershed effects: Caspar Creek and beyond. In: Ziemer, Robert R., technical coordinator. Proceedings of the conference on coastal watersheds: the Caspar Creek story, 1998 May 6; Ukiah, CA. General Tech. Rep. PSW GTR-168. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 117-127.

Reid, Leslie M., and Sue Hilton. 1998. Buffering the buffer. In: Ziemer, Robert R., technical coordinator. Proceedings of the conference on coastal watersheds: the Caspar Creek story, 1998 May 6; Ukiah, CA. General Tech. Rep. PSW GTR-168. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 71-80.

Reifsnyder, W.E. and H.W. Lull. 1965. Radiation Energy in Relation to Forest Science. Washington D.C. USDA-FS Technical Bulletin 1344.

Reynolds, R. & B. Linkhart. 1992. "Flammulated Owls in Ponderosa Pine: Evidence for Preference of Old Growth." Proceedings of a Workshop on Old Growth Forests in the Southwest and Rocky Mountain Region. Gen Tech Rept RM-213. USDA Forest Service, Portal, AZ.

Rodrick, E. and R. Milner. 1991. Management Recommendations for Washington's Habitats and Species. Washington Department of Wildlife, Seattle, Washington.

Rudolph, D.C., and J.G. Dickson. 1990. Streamside Zone Width and Amphibian and Reptile Abundance. The Southwest Journal. 35(4):472-476

Ruggerio, L., K. Aubrey, A. Carey, et al, eds. 1991. Wildlife and Vegetation of Unmanaged Douglas Fir Forests. Gen. Tech. Rept. PNW-GTR-285. Pacific Northwest Range and Forest Experiment Station, USDA Forest Service, Portland, OR.

Salwasser, H. & F. Samson. 1985. "Cumulative Effects Analysis: An Advance in Forest Planning and Wildlife Management." Transactions North American Wildlife and Natural Resources Conference. 50:313-321.

Schillinger, Randy, et al. 1998. Impact on Industrial Timberlands Value of "No Touch" Buffer Zones Along Waterways in Western Washington. prepared for Washington Environmental Council. Eugene, OR.

Schowalter, Timothy et al. 1997. "Integrating the Ecological Roles of Phytophagous Insects, Plant Pathogens, and Mycorrhizae in Managed Forests." in Kohm et al. (1997).

Shaffer, M. 1992. "Keeping the Grizzly Bear in the American West: A Strategy for Real Recovery." The Wilderness Society, Washington, DC.

Shaffer, M. 1992. "Population Viability Analysis." in D. Decker et al, eds, Challenges in the Conservation of Biological Resources, A Practioner's Guide. Westview Press.

Sharp, B. 1992. "Neotropical Migrants on National Forests in the Pacific Northwest: A Compilation of Existing Information." Portland, OR.

Sidle, R.C., A.J. Pearce, and C.L. O'Laughlin. 1985. Hillslope Stability and Land Use. Water Resources Monograph Series II.

Spackman, S.C. and J.W. Hughes. 1994. Assessment of Minimum Stream Corridor Width for Biological Conservation: Species Richness and Distribution along Mid-Order Streams in Vermont, USA. Biological Conservation. 71(3):325-332.

Spence, B., et al. An Ecosystem Approach to Salmonid Conservation. ManTech Environmental Research Service, Corvallis, OR. TR-4501-96-6057. Prepared for the National Marine Fisheries Service, Portland, OR.

Spies, T. ___. "Plant Species Diversity and Occurrence in Young, Mature, and Old Growth Douglas Fir Forests in Western Oregon and Washington."

Spies, T. & J. Franklin. ____. "The Structure of Natural Young, Mature, and Old Growth Douglas Fir Forests in Oregon and Washington."

Spies, T. & J. Franklin. 1988. "Old Growth and Forest Dynamics in the Douglas Fir Region of Western Oregon and Washington." Natural Areas Journal. 8;3.

Stebbins, R. 1954a. Amphibians of Western North America. McGraw Hill Books, New York, NY.

Stebbins, R. 1954b. Natural History of the Salmanders of the Plethodontid Genus Ensatina. Zoology Publications. University of California. 54;47-123.

Steinblums, I.J. 1977. Streamside Buffer Strips: Survival, Effectiveness, and Design. M.S. Thesis. Oregon State University, Corvallis, OR. 181 pp.

Swanson, F. et al. 1976. History, Physical Effects, and Management Implications of Large Organic Debris in Western Oregon Streams. PNW-56. Pacific Northwest Forest & Range Research Station, USDA Forest Service.

Takentat, A. 1988. An Analysis of Solar Beam Penetration Through Circular Gaps in Canopies of Uniform Thickness. Agricultural and Forest Meteorology. 42:307-320.

Thomas et al. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team.

Thomas, C. 1990. "What Do Real Population Dynamics Tell Us About Minimum Viable Population Sizes?" Conservation Biology. 4(3):324-325.

Thompson, G. 1991. Determining Minimum Viable Populations Under the Endangered Species Act. NOAA Technical Memorandum NMFS/F/NWC-198. National Marine Fisheries Service, Seattle, WA.

Tilt, W., R. Norris, & A. Eno. 1987. "Wolf Recovery in the Northern Rocky Mountains." National Audubon Society and National Wildlife Federation, Washington, DC.

Trotter, P. 1995. Occurrence and Habitat Requirements of Headwater Resident Trout in Washington Streams. Report to Washington Trout. Duvall, WA.

USDA FS. Guidelines for Habitat Conservation Assessments. USDA Forest Svc., Washington, DC.

USDA FS *et al.* 1993. Forest Ecosystem Management: an Ecological, Economic, and Social assessment. Report of the Forest Ecosystem Management Assessment Team. USDA Forest Service, USDOI FWS, USDOI BLM, US EPA, USDOI NPS, and USDOC NMFS. (1993).

USFWS. 1998. Letter of February 16, 1998, to Wille Stelle, Jr., Regional Administrator, NMFS, Conveying Comments on the NMFS "Draft Proposal to Improve Oregon Forest Practices." US Fish & Wildlife Service, Portland, OR.

USFWS. 1998b. Bull Trout Interim Conservation Guidance. US Fish & Wildlife Service, Lacey, WA.

Van Sickle, J. and S.V. Gregory. 1990. Modeling Inputs of Large Woody Debris to Streams from Falling Trees. Canadian Journal of Forest Research. 20:1593-1601.

Vogel, W. 1998. Letter to John Engbring, USFWS, Lacey Washington, regarding "Addition of the Columbia River...Bull Trout to Incidental Take Permit...for Plum Creek Timber Company and Anticipated Take Levels..." Western Washington Office, US Fish & Wildlife Service, Lacey, WA.

WA DFW. 1997a. Management Recommendations for Washington's Priority Habitats -- Amphibians and Reptiles. Washington State Dept. Fish & Wildlife, Olympia, WA.

WA DFW. 1997b. Management Recommendations for Washington's Priority Habitats -- Riparian. Washington State Dept. Fish & Wildlife, Olympia, WA.

WA DFW. 1995. Management Recommendations for Washington's Priority Habitats -- Invertebrates. Washington State Dept. Fish & Wildlife, Olympia, WA.

WA DNR TFW. 1997. Draft species lists developed by the Landscape & Wildlife Advisory Group, Timber Fish & Wildlife Program, Washington Department of Natural Resources, Olympia, WA.

WAFC. 1997b. Summary of Information on Late Successional Species From the FEMAT Report. Western Ancient Forest Campaign, Portland, OR.

Walker, Brian et al. 1999. "The Terrestrial Biosphere and Global Change: Implications for Natural and Managed Ecosystems." Cambridge Univ. Press.

Walls, S., A. Blaustein, & J. Beatty. 1992. "Amphibian Biodiversity of the Pacific Northwest with Special Reference to Old Growth Stands." Northwest Environment Journal. 8(1):53-69.

Warren, N. ed., 1990. Old Growth Habitats and Associated Wildlife in the Northern Rocky Mountains. Forest Service Report R1-90-42. Northern Region Wildlife Habitat Relationships Program, USDA Forest Service, Missoula, MT.

Weaver, W., & D. Hagans. 1994. Handbook for Forest and Ranch Roads: A Guide for Planning, Designing, Constructing, Reconstructing, and Closing Wildland Roads. Prepared by Pacific Watershed Associates for Mendocino County Resource Conservation District, Ukiah, CA.

Welsh, H. 1990. "Relictual Amphibians and Old Growth Forests." Conservation Biology. 4(3):309-319.

Wemple, B., J. Jones, & G. Grant. 1996. Channel Network Extension by Logging Roads in Two Basins in Western Cascades, Oregon. Water Resources Bulletin. 32(6);11185.

Wilcove, D., C. McLellan, & A. Dobson. 1986. "Habitat Fragmentation in the Temperate Zone." in M. Soule, ed., Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates.

Willson, M. S. Gende, & B. Marston. 1998. "Fishes and the Forest: Expanding Perspectives on Fish-Wildlife Interactions." BioScience. 48;6. June, 1998.

Willson, M. & K. Halupka. 1995. "Andadromous Fish as Keystone Species in Vertebrate Communities." Conservation Biology. 9;3. June, 1995.

Wu, T.H. 1986. Root Geometry Model and Simulation. Unpublished Final Report. National Science Foundation Grant DEE-811253. USDA Forest Service Grant PNW-83-317. Department of Civil Engineering, Ohio State University, Ohio.

Also, see Mayer et al. (1988) above under Species Lists, and Applegarth et al (1997), Benda et al. (1998), (Bingham) et al (1997), Erman, Erman, & Schilling (1999), Frissell (1998), Heiken et al (1997),

Huntington (1998), Karr (1991), King (1989), Lichatowich et al (1997), Meehan et al (1991), Moyle et al (1999), Nelson et al (1999), PAS (1997), Pollock et al (1999), PRC (1997), Reid (1998), Reid (1999), Soule et al (1987), and Welsh et al (1998) below under Assessments. Benda et al. (1998) also lists additional resources for terrestrial species (be sure to get the full report).

Additional Research Indicating That Logging and Associated Road Building Can Impact Fluvial Peak Flows and In-Stream Habitat Conditions:

Chamberlin, T.W., Harr, R.D. and F.H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. American Fisheries Society Special Publication 19:181-205.

Chamberlin, T.W. 1982. Influence of forest and rangeland management on anadromous fish habitat in western North America: timber harvest. USDA Forest Service, Pacific Northwest Forest and Range Experimentation Station. GTR-136.

Cheng, J.D., Black, T.A., de Vries, J., Willington, R.P. and B.C. Goodell. 1975. The evaluation of initial changes in peak streamflow following logging of a watershed on the west coast of Canada. International Association of Hydrological Sciences Publication 117:1-21.

Espinosa, Jr., F.A, Rhodes, J.J. and D.A. McCullough. 1997. The failure of existing plans to protect salmon habitat in the Clearwater National Forest in Idaho. Journal of Environmental Management 49:205-230.

Grant, G. 1994. Peak Flow Responses to Clearcutting and Roads. Invited Presentation to the Timber/Fish/Wildlife Low Elevation Hydrology Workshop. March 11, 1994. Olympia, WA.

Grant, G and J. Jones. 1996. Peak Flow Responses to Clearcutting and Roads, Western Cascades, Oregon. Water Resources Research. April, 1996.

Harr, R.D. 1986. Effects of clearcutting on rain-on-snow runoff in western Oregon: a new look at old-studies. Water Resources Research 22(7):1095-1100.

Harr, R.D. 1979. Effects of timber harvest on streamflow in the rain-dominated portion of the Pacific Northwest. In: Proceedings of the workshop on scheduling timber harvest for hydrologic concerns. Pacific Northwest Region, USDA Forest Service. Portland, OR.

Hart, G. E., Jr. 1966. Forest cutting to increase streamflow in the White Mountains. New Hampshire Forest Notes No. 89, pp. 6-9.

Hornbeck, J. W. 1973. Storm flow from hardwood-forested and cleared watersheds in New Hampshire. Water Resour. Res. 9(2):346-354.

Hornbeck, J. W., R. S. Pierce and C. A. Federer. 1970. Streamflow changes after forest clearing in New England. Water Resour. Res. 6(4):1124-1132.

Hornbeck, J. W. and R. S. Pierce. 1970. Storm hydrograph changes following forest clearing in New England. Proc. 15th IUFRO Congress, Gainesville, Florida. p. 230.

Hornbeck, J. W. 1975. Streamflow response to forest cutting and revegetation. Water Resour. Bull. 11(6):1257-1260.

Hornbeck, J. W., G. E. Likens, R. S. Pierce and F. H. Bormann. 1975. Strip cutting as a means of protecting site and streamflow quality when clearcutting northern hardwoods. pp. 208-229. In: B. Bernier and C. H. Winget (eds.). Proc. 4th North American Forest Soils Conference on Forest Soils and Forest Land Management. August 1973. Quebec, Canada.

Hornbeck, J. W., R. S. Pierce, G. E. Likens and C. W. Martin. 1975. Moderating the impact of contemporary forest cutting on hydrologic and nutrient cycles. pp. 423- 433. In: Proc. of Internat. Symp. on Hydrologic Sciences. Publ. 117. Tokyo, Japan.

Hornbeck, J. W. and G. Stuart. 1976. When ski trails are cut through forest land, what happens to stream flow? Ski Area Management 15(4):34-36, 47.

Hornbeck, J. W. and S. J. Ursic. 1979. Intensive harvest and forest streams: are they compatible? pp. 249-262. In: Proc. Impact of Intensive Harvesting on Forest Nutrient Cycling. SUNY, College of Environmental Science and Forestry, Syracuse.

King, J. 1989. Streamflow responses to roadbuilding and harvesting: a comparison with the equivalent clearcut area procedure. Intermountain Research Station, USDA Forest Service. Research Paper INT-401. Ogden, UT.

Lavigne, R. W. 1960. A time-corrector device for adjusting streamflow records. U.S. Forest Service, Northeastern Forest Experiment Station, Forest Research Note 98. 4 pp.

Lawrence, G. B. and C. T. Driscoll. 1989. Spatial patterns of concentration-discharge relationships in stream water draining the Hubbard Brook Experimental Forest, New Hampshire. Abstract for Chapman Conference on Hydrogeochemical Responses of Forested Catchments, American Geophysical Union, Bar Harbor, Maine.

Leaf, C.F. 1975. Watershed management in the central and southern Rocky Mountains: a summary of the status of our knowledge by vegetation types. Research Paper RM-142. Rocky Mountain Forest and Range Experiment Station, USDA Forest Service. Fort Collins, CO. 28 pp.

Leaf, C.F. 1975. Watershed management in the subalpine zone: the status of our knowledge. Research Paper RM-137. Rocky Mountain Forest and Range Experiment Station, USDA Forest Service. Fort Collins, CO. 31 pp.

Likens, G. E. 1989. Linkages between hydrology and biogeochemistry in forested catchments. Abstract for Chapman Conference on Hydrogeochemical Responses of Forested Catchments, American Geophysical Union, Bar Harbor, Maine.

Likens, G. E. 1972. Effects of deforestation on water quality. pp. 133-140. In: Proc. Amer. Soc. Civil Engineers Symp. on Interdisciplinary Aspects of Watershed Management. August 1970. Bozeman, Montana.

Lull, H. W. and R. S. Pierce. 1960. Prospects in the Northeast for affecting the quantity and timing of water yield through snowpack management. West. Snow Conf. Proc., pp. 54-62.

Lull, H. W. and R. S. Pierce. 1960. Prospects in the Northeast for affecting the quantity and timing of water yield through snowpack management. West. Snow Conf. Proc., pp. 54-62.

Martin, C. W. and J. W. Hornbeck. 1972. Lysimeter snowmelt and streamflow on forested and cleared sites. pp. 111-118. In: Eastern Snow Conference Proceedings.

Montana Bull Trout Scientific Group (MBTSG). 1998. The relationship between land management activities and habitat requirements of bull trout. Montana Bull Trout Restoration Team, Helena, MT

Mosko, T.L., Jeffers, B.L., King, J.G., and W.F. Megahan. 1990. Streamflow data for undisturbed, forested watersheds in central Idaho. USDA Forest Service, Intermountain Forest and Range Experiment Station. GTR INT-272.

Pierce, R. S. 1973. Forest management -- its impact on the hydrology and ecosystems. Bull. Ecol. Soc. Amer. 54(1):15.

Pierce, R. S. 1971. Clear cutting and stream water. New Hampshire Forest Notes. [spring]

Pierce, R. S. 1969. Forest transpiration reduction by clearcutting and chemical treatment. Northeastern Weed Control Conference 23:344-349.

Reiners, W. A. 1991. Twenty years of ecosystem development on a clear-cut watershed at Hubbard Brook Experimental Forest. Bull. Ecol. Soc. Amer. 72(2):228.

Reiners, W. A. and T. L. Gates. 1993. Spatial patterning of ecosystem recovery on a deforested watershed, Hubbard Brook, New Hampshire. Bull. Ecol. Soc. Amer. 74(2):406.

Sidle, R. C. and J. W. Hornbeck. 1991. Cumulative effects: a broader approach to water quality research. J. Soil and Water Conserva. 46:268-271.

Smith, D. K. 1982. The knowledge flows from Hubbard Brook. An advanced ecosystem study. Yale Alumni Magazine and Journal XLV(6):17-20.

Sullivan, K., Lisle, T.E., Dolloff, C.A., Grant, G.E., and L.M. Reid. 1987. Stream channels: the link between forests and fishes. In: Streamside management: forestry and fishery interations. E.O. Salo and T.W. Cundy, eds. University of Washington, Institute of Forest Resources Contribution 57. Seattle, WA.

Troendel, C.A. 1980. Watershed management in the Rocky Mountains. In: Proceedings from the Rocky Mountain Forest Industries Conference. May 7-8, 1980. Jackson, WY.

Troendel, C.A. and R.M. King. 1987. The effect of partial and clearcutting on streamflow at Deadhorse Creek, Colorado. Journal of Hydrology 90:145-157.

Troendel, C.A. and R.M. King. 1985. The effect of timber harvest on the Fool Creek watershed, 30 years later. Water Resources Research 21(12):1915-1922.

U.S. Department of Agriculture, Forest Service (USFS). 1981. Guide for predicting sediment yields from forested watersheds. US Forest Service Northern Region, Intermountain Region, and Intermountain Forest and Range Experiment Station.

U.S. Department of Agriculture, Forest Service (USFS). 1974. Forest Hydrology part II – Hydrologic effects of vegetation manipulation. Missoula, MT: U.S. Department of Agriculture, Forest Service. 229 pp.

USDA Forest Service (USFS). [year?] WATSED: water and sediment yields. Range, Air, Watershed, and Ecology Staff Unit, USDA Forest Service, Region 1 and Montana Cumulative Watershed Effects Cooperative.

Weaver, T.M. and J.J. Fraley. 1991. Fisheries habitat and fish populations. Flathead basin forest practices, water quality and fisheries cooperative program. Flathead Basin Commission, Kalispell, MT.

Zuuring, H.R. and D.F. Potts. WATSIM: a user's guide. Montana Forest and Conservation Experiment Station. School of Forestry, University of Montana, Missoula.

Additional References and Resources Regarding Livestock Grazing:

Armour, C. L., D. A. Duff, W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. Fisheries 16(1): 7-11.

Armour, C., D. Duff, W. Elmore. 1994. The effects of livestock grazing on western riparian and stream ecosystem. Fisheries 19(9): 9-12.

Belsky, A. J. 1986. Does herbivory benefit plants? A review of the evidence. Amer. Natur. 127: 870-892.

Belsky, A. J. 1987. The effects of grazing: confounding ecosystem, community, and organism scales. Amer. Natur. 127: 870-892.

Belsky, A. J. and D. M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the interior West. Conserv. Biol. 11: 315-327.

Belsky, A. J., A. Matzke, S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. J. Soil and Water Conserv. 54(1): 419-431.

Beschta, R. L. 1991. Stream habitat management for fish in the northwestern United States: the role of riparian vegetation. Amer. Fisheries Soc'y Symp. 10: 53-58.

Beschta, R. L., W. L. Platts, J. B. Kauffman, M. T. Hill. 1994. Artificial stream restoration—money well spent or an expensive failure? *IN* Environmental Restoration: Proc. Universities Council on Water Resources, 1994.

Chaney, E., W. Elmore, W. S. Platts. 1990. Livestock grazing on western riparian areas. Northwest Resource Information Center. Eagle, ID. 45 pages.

Chaney, E., W. Elmore, W. S. Platts. 1993. Managing change: livestock grazing on western riparian areas. Northwest Resource Information Center. Eagle, ID. 31 pages.

Elmore, W. 1992. Riparian responses to grazing practices. Pages 442-457 *IN* R. J. Naiman (ed.). WATERSHED MANAGEMENT: BALANCING SUSTAINABILITY AND ENVIRONMENTAL CHANGE. Springer Verlag. New York, NY.

Elmore, W. 1996. Riparian areas: perceptions in management. USDA – Forest Service, Pacific Northwest Res. Stn. Natural Resource News 6(3): 9.

Elmore, W. and B. Kauffman. 1994. Riparian and watershed systems: degradation and restoration. Pages 212-231 *IN* M. Vavra, W. A. Laycock, R. D. Pieper (eds.). ECOLOGICAL IMPLICATIONS OF LIVESTOCK HERBIVORY IN THE WEST. Soc. Range Manage. Denver, CO.

Elmore, W. and R. L. Beschta. 1987. Riparian areas: perceptions in management. Rangelands 9: 260-265.

Fleischner, T. L. 1994. Ecological costs of livestock grazing in western North America. Conserv. Biol. 8: 629-644.

Kauffman, J. B. and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: a review. J. Range Manage. 37: 430-437.

Kauffman, J. B., W. C. Krueger, M. Vavra. 1983a. Impacts of cattle on streambanks in northeastern Oregon. J. Range Manage. 36: 683-685.

Kauffman, J. B., W. C. Krueger, M. Vavra. 1983b. Effects of late season cattle grazing on riparian plant communities. J. Range Manage. 36: 685-691.

Kauffman, J. B., W. C. Krueger, M. Vavra. 1983c. Effects of late season cattle grazing on riparian ecosystems and streamside management implications: a review. J. Range Manage. 37(5): 430-438.

Ohmart, R. D. 1996. Historical and present impacts of livestock grazing on fish and wildlife resources in western riparian habitats. Pages 245-279 *IN* P. R. Krausman (ed.). RANGELAND WILDLIFE. Soc. Range Manage. Denver, CO.

Todd, M. and W. Elmore. 1997. Historical changes in western riparian ecosystems. Trans. North Amer. Wildl. and Nat. Res. Conf. 62: 454-468.

Wilcove, D. 1998. Quanitifying Threats to Imperiled Species in the United States. BioScience: 48(8): 610–.

Forest Management Considerations and Alternatives:

American Lands. 1999. Improving Forest HCPs by Recognizing the Practicability of Alternative Forest Management Regimes. American Lands Alliance, Portland, OR.

Franklin, J. *et al.* 1998. ""Alternative Silvicultural Approaches to Timber Harvesting: Variable Retention Systems." in Kohm *et al* (1998)

Franklin, J. 1989. "Importance of Ecological Diversity in Maintaining Long Term Site Productivity." in D. Perry, ed., Maintaining the Long Term Productivity of Pacific Northwest Coniferous Forests, Oregon State University Press, Corvallis, OR.

Kohm, K., et al. 1997. Creating a Forestry for the 21st Century: The Science of Ecosystem Management. Kathryn Kohm & Jerry Franklin, eds. Island Press, Covelo, CA.

McComb, William *et al.* 1993. "Douglas Fir Forests: Managing for Timber and Mature Forest Habitat." Journal of Forestry. 91;12.

Perry, D. 1994. Forest Ecosystems. Department of Forest Science & Cascade Center for Ecosystem Management, Oregon State University, Corvallis, OR. Johns Hopkins University Press.

Assessments, Guidebooks, and Recommended Standards for Mitigation, Adaptive Management, Etc.:

Ackerman, S. 1997. Conservation Principles for Western Oregon State Forest Habitat Conservation Plan. National Wildlife Federation, Portland, OR.

Aengst, P., et. al. 1998. Balancing Public Trust and Private Interest: An Investigation of Public Participation in Habitat Conservation Planning. Masters Thesis. School of Natural Resources, University of Michigan, Ann Arbor, MI.

American Lands. 1999. Summary of Westside Forest Management Standards for Aquatic/Riparian Resources. Forest Biodiversity Program, American Lands, Portland, OR.

American Lands. 1998b. Inventory of Pending and Approved Forest HCPs in Western States. American Lands Alliance, Forest Biodiversity Program, Portland, OR.

American Lands. 1998. Examples of Fish and Wildlife Conservation Needs on Non-Federal Forestlands and Species Harmed by HCPs. Forest Biodiversity Program, American Lands, Portland, OR. Available at <www.americanlands.org>

Applegarth, John, et. al. 1997. A Peer Review of the Weyerhaeuser Willamette Habitat Conservation Plan and Environmental Analysis. Chris Beckwith, ed. Commissioned by Portland Audubon Society, Portland, OR. Available from PAS at 503-292-6855.

Bean, M. 1998. "Four Sure Ways to Undermine a Good Idea...And Hurt Endangered Species." Endangered Species UPDATE. 15(6).

Bean, M., et al. 1991. Reconciling Conflicts Under the Endangered Species Act: The Habitat Conservation Planning Experience. World Wildlife Fund. Washington, DC.

Benda, L., et al. 1998. Independent Scientific Review of Oregon Dept. of Forestry's Proposed W. Oregon State Forests HCP. John Hayes, ed. College of Forestry, Oregon State Univ. Corvallis, OR.

Bingham, Bruce, et. al. 1997. "Mitigation of Habitat "Take:" Application to Habitat Conservation Planning." Conservation Biology. 11;1.

Cheever, Frederico, et al. 1998. Summary of Key Findings and Recommendations from the Workshop on Optimizing Habitat Conservation Planning. Natural Heritage Institute, San Francisco, CA.

Clark, T., et al. 1994. Endangered Species Recovery: Finding the Lessons, Improving the Process. Island Press, Covelo, CA.

EPIC & Sierra Club. 1998. Synopsis of Biological Opinions Issued by USFWS, Region 1. Environmental Protection Information Center, Redway, CA, & Sierra Club, San Francisco, CA. Available through American Lands' Forest Biodiversity Program, Portland, OR.

Erman, Nancy, L. Reid, D. Erman, H. Welsh, & F. Schilling. 1999. Comments on Pacific Lumber's Headwaters HCP. Independent analyses of the Headwaters HCP. Available at <www.igc.org/epic/pages/hcp_review.html>

Frissell, C. 1998. Comments on the Sustained Yield Plan/Habitat Conservation Plan for the Pacific Lumber Company.

GAO. 1994. Endangered Species Act: Information on Species Protection on NonFederal Lands. Report to Congressional Requestors. US General Accounting Office, Washington, DC.

Hall, D. 1997. "Using Habitat Conservation Plans to Implement the Endangered Species Act in Pacific Coast Forests: Common Problems and Promising Precedents." Environmental Law. 27;3.

Hood, L. et al. 1998. Frayed Safety Nets: Conservation Planning Under the Endangered Species Act. Defenders of Wildlife, Washington DC.

Hrubes, Robert, et. al. 1999. Comments of the Silviculture Review Team Members on Pacific Lumber's Headwaters HCP. Commissioned by EPIC, Redway, CA, and Sierra Club - California. Available at <www.igc.org/epic/pages/hcp_review.html>

Huntington, C. 1998. Comments on April '98 Draft W. Oregon State Forests HCP as a Mechanism for Restoring Aquatic Habitats and At-Risk Salmon. Clearwater BioStudies, Canby, OR.

Jackson, Jerome. 1997. "Niche Concepts and Habitat Conservation Planning." Endangered Species Update. 14;7&8. School of Natural Resources & Environment, University of Michigan, Ann Arbor.

Kaiser, J. 1997. "When Habitat is Not a Home." Science. 276;1636.

Kareiva, Peter, et al. 1999. Using Science in Habitat Conservation Plans. National Center for Ecological Analysis & Synthesis, Santa Barbara, CA, and the American Institute of Biological Sciences, Washington, DC.

Karr, J. and E. W. Chu. 1999. Restoring Life in Running Waters: Better Biological Monitoring. Island Press, Washington, DC.

Karr, J. 1998. "Rivers as Sentinels: Using the Biology of Rivers to Guide Landscape Management." River Ecology and Management: Lessons from the Pacific Coastal Region. R. Naiman and R. Bilby, eds. Springer, NY.

Karr, J. 1991. "Biological Integrity: A Long Neglected Aspect of Water Resource Management." Ecological Applications. 1:66-84. (proposes water quality and aquatic ecosystem monitoring indicators)

King, J. 1989. Streamflow Responses to Road Building and Harvesting: A Comparison With the Equivalent Clearcut Procedure. Rsch Paper INT-401. USDA Forest Service, Intermountain Forest & Range Experiment Station, Ogden, UT.

Kostyack, John. 1998. "Surprise!" The Environmental Forum. 15;2. Environmental Law Institute.

Lichatowich, Jim, et. al. 1997. Scientific Panel Comments on the Multi-Species Conservation Plan for the Weyerhaeuser Willamette Timberlands. Commissioned by the Pacific Rivers Council, Eugene, OR. Available from the PRC at 541-345-0119.

McCammon, B. 1993. Determining the Risk of Cumulative Watershed Effects Resulting From Multiple Activities Under Section 7 of the ESA. USDA Forest Service.

Meehan, et al. 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. Special Pub. 19. American Fisheries Society, Bethesda, MD.

Minnette, M., et al. 1997. A Citizen's Guide to Habitat Conservation Plans. National Audubon Society. Washington, DC.

Moyle, Peter, et. al. 1999. Comments of Aquatics Review Team Members on the Pacific Lumber's Headwaters HCP. Commissioned by EPIC, Redway, CA, and Sierra Club - California. Available at <www.igc.org/epic/pages/hcp_review.html>

Murphy, D., et al. 1996. A Statement On Proposed Private Lands Initiatives and Reauthorization of the Endangered Species Act from the Meeting of Scientists at Stanford University. In Noss *et al.* (1997).

National Audubon Society. 1997. Report of the National Audubon Society Task Force on Habitat Conservation Plans. National Audubon Society, Washington, DC.

Nelson, Kim, et. al. 1999. Comments of the Marbled Murrelet, Northern Spotted Owl, and Unlisted Species Review Teams Members on the Headwaters HCP. Commissioned by EPIC, Redway, CA, and Sierra Club - California. Available at <www.igc.org/epic/pages/hcp_review.html>

NHI. 1998. Compendium of Empirical Reviews and Scholarly Analysis of the Experience with Habitat Conservation Planning Under Section 10 of the Endangered Species Act. Natural Heritage Institute, San Francisco, CA.

Nielsen, J. 1998. "Electrofishing California's Endangered Fish Populations." National Marine Fisheries Service (?).

Noss, R., et al. 1997. The Science of Conservation Planning: Habitat Conservation Under the Endangered Species Act. World Wildlife Fund, Washington, DC. Island Press, Covelo, CA.

Noss, R., et al. 1994. Saving Nature's Legacy. Island Press.

PAS. 1997. A Peer Review of the Weyerhaeuser Willamette Habitat Conservation Plan and Environmental Analysis. Chris Beckwith, et al, eds. Portland Audubon Society, Portland, OR.

Pollock, M., D. Montgomery, J. Karr, et al. 1999. Letter to Washington Governor Gary Locke, Commenting on the "Forests & Fish Report."

PRC. 1997. Scientific Panel Comments on the Multi-Species Conservation Plan for the Weyerhaeuser Willamette Timberlands. Pacific Rivers Council, Eugene, OR.

PRC. 1996. Healing the Watershed: A Guide to the Restoration of Watersheds and Native Fish in the West. Pacific Rivers Council, Eugene, OR.

Raines, C., et. al. 1997. HCP Guidance for Sierra Club. Unpublished. Seattle, WA.

Reid, Leslie M. 1998. Review of the Sustained Yield Plan / Habitat Conservation Plan for the properties of The Pacific Lumber Company. Unpublished report prepared at the request of Congressman George Miller and EPA.

Reid, Leslie M. 1999. Review of the Final EIS/EIR and HCP/SYP for the Headwaters Forest. Unpublished report prepared at the request of Congressman George Miller.

Roper, R., et al. 1997. Stream Restoration: Is Fisheries Biology Enough? Fisheries. 22;5.

Ruhl, J. 1995. Regional Habitat Conservation Planning Under the Endangered Species Act: Pushing the Legal and Practical Limits of Species Protection. SW.L.J. 44;1393.

Schilling, Fraser. 1997. "Do Habitat Conservation Plans Protect Endangered Species?" Science. 276;1662.

Smallwood, K, et al. (submitted for publication) Using the Best Scientific Data for Endangered Species Conservation.

Soule, M., et al. 1987. Viable Populations for Conservation. Michael Soule, ed. Cambridge Press.

Taylor, Melinda. 1994. "Promoting Recovery or Hedging a Bet Against Extinction: Austin, Texas' Risky Approach to Ensuring Endangered Species' Survival in the Texas Hill Country." Environmental Law. 24;2.

Tear, T. et al. 1995. Recovery Plans and the Endangered Species Act: Are Criticisms Supported by Data? Conservation Biology. 9;1.

USFWS. 1999. Draft Environmental Assessment for the Issuance of an Incidental Take Permit...for the Incidental Take of the Northern Spotted Owl...to Boise Cascade Corporation for Property Located in Clatsop County, Oregon. US Fish & Wildlife Service, Portland, OR.

USFWS et al. 1998. Draft Environmental Impact Statement/Environmental Impact Report for the Headwaters Forest Acquisition and the PalCo Sustained Yield Plan and Habitat Conservation Plan. Vol. II. Prepared by the US Fish & Wildlife Service, Arcata, CA, and the California Dept. of Forestry & Fire Protection, Sacramento, CA.

WAFC *et al.* 1997. Giving It All Away: The "No Surprises" Policy and the Future of Endangered Species, Northwest Forests, and Public Policy. Western Ancient Forest Campaign, Portland, OR.

Walley, KK. 1996. "Surprises Inherent in the No Surprises Policy." Endangered Species Update. 13;10&11. School of Natural Resources & Environment, University of Michigan, Ann Arbor.

Welner, J. 1995. Natural Communities Conservation Planning: An Ecosystem Approach to Protecting Endangered Species. Stanford Law Review. 47; 319.

Welsh, H., A. Lind, L. Ollivier, et al. 1998. Comments on the PalCo HCP/SYP and EIS/EIR With Regard to the Maintenance of Riparian, Aquatic, and Late Seral Ecosystems and Their Associated Amphibian and Reptile Species. Herpetology Research Group, Pacific Southwest Research Station, USDA Forest Service, Arcata, CA.

Wilcove, D., et al. 1996. Rebuilding the Ark: Towards a More Effective Endangered Species Act for Private Land. Environmental Defense Fund, Washington, DC.

ESA and HCP Policies:

Arum, J. 1998. Letter to William Daley, *et al*, Regarding the Tribes' Notice of Intent to Sue. Ziontz, Chestnut, Varnell, Berley, & Slonim, Seattle, WA.

Council on Environmental Quality. Guidelines for NEPA scoping. Available online at: <http://ceq.eh.doe/gov/nepa/regs/scope/scoping.html>

Endangered Species Act. Codified at 16 U.S.C. ss. 1531-1544. Available through USFWS website.

Gaffney, B., et al. 1997. Letter to Bruce Babbitt, et. al., Regarding Agency Discretion in Processing Pacific Lumber Company's Habitat Conservation Plan. Law Office of Brian Gaffney, Oakland, CA.

Hall, D. 1999. "Incentives and Land Acquisition: Key Tools for Restoring Fish and Wildlife Habitat." Endangered Species UPDATE. 16(3).

Heiken, D. 1997. Letter to Sec. Bruce Babbitt, et al, From the ONRC, et al, on Procedural Concerns With Weyerhaeuser Willamette HCP. Oregon Natural Resources Council, Eugene, OR.

Heiken, D., et al. 1997. Letter to Curt Smitch, USFWS, et al, from the ONRC, et al, Regarding the Weyerhaeuser Willamette HCP. Oregon Natural Resources Council, Eugene, OR.

Keeton, B., et al. 1996. Comments of the Wilderness Society on Draft Environmental Alternatives Analysis for a 4(d) Rule for the Conservation of Northern Spotted Owl on Non Federal Lands. The Wilderness Society, Seattle, WA.

Mueller, T., et al. 1996. Letter to Secretary Bruce Babbitt et al Regarding Pacific Lumber Application for Incidental Take Permit. Law Office of Brian Gaffney, Oakland, CA.

Mueller, T., et al. 1997. Letter to Bruce Halstead, USFWS, on EPIC and Sierra Club NEPA Scoping Comments for Louisiana Pacific HCP. Env. Law Found. and Law Office of Brian Gaffney.

NMFS. 1997. Memorandum of Agreement Between the State of Oregon and the National Marine Fisheries Service. National Marine Fisheries Service.

No Surprises Rule. Amendments to 50 CFR 17 and 50 CFR 222. 63 Federal Register 35, February 23, 1998.

Notice of Availability of a Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process. [Federal Register, 64;45, March 9, 1999]

Safe Harbors Agreements and Candidate Conservation Agreements....Final Rule and Notices. [June 17, 1999 Federal Register, 64;116]

Safe Harbor Policy and Candidate Conservation Agreements Draft Policy, Notices; and Safe Harbor and Candidate Conservation Agreements, Proposed Rule. 62 Fed. Reg. 113 (June 12, 1997).

Sierra Club et al v. Bruce Babbitt et al. [Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

USEPA. 1998. Biological Assessment of the Revised Oregon Water Quality Standards for Dissolved Oxygen, Temperature, and pH. Prepared for the US Fish & Wildlife Service and National Marine Fisheries Service by the US Environmental Protection Agency, Seattle, WA.

USFWS et al. 1994. Preliminary Draft Handbook for Habitat Conservation Planning and Incidental Take Permit Processing. US Fish & Wildlife Service and National Marine Fisheries Service. Washington, DC.

USFWS et al. 1996. Endangered Species Habitat Conservation Planning Handbook. US Fish & Wildlife Service and the National Marine Fisheries Service. Washington, DC.

#5L984

August 7, 2000

TO: James Bond
NMFS
1655 Heindon Rd.
Arcata, CA 95521

Amedee Brickey
USFWS
1655 Heindon Rd.
Arcata, CA 95521

FR: Daniel Hall, Director
Forest Biodiversity Program
American Lands

RE: **NEPA Scoping Comments on Simpson Timber Company Incidental Take Permit and Enhancement of Survival Permit for Del Norte and Humboldt Counties**

Enclosed, please find our comments on the scope and contents of the Environmental Impact Statement (EIS) to be prepared in relation to the Simpson Timber Co.'s proposed application for an Incidental Take Permit (ITP) and Enhancement of Survival Permit (ESP), as per the notice in the July 11, 2000, Federal Register (65;133).

American Lands is governed by and represents citizens from across the United States who seek to protect and restore our forests, watersheds, and biotic resources for the benefit of future generations. American Lands' Forest Biodiversity Program is dedicated to promoting improved biodiversity conservation and resource management on non-Federal forestlands in the west, including through incentives and more effective policy implementation.

Where the following comments refer to Habitat Conservation Plans (HCPs) and/or Incidental Take Permits (ITPs), they should generally be understood to also refer to Candidate Conservation Agreements (CCAs) and/or Enhancement of Survival Permits (ESPs).

Thank you for providing this opportunity to comment. Our apologies for any redundancies in the following comments and suggestions; we only recently learned of the opportunity for public comment, and have had little time to prepare these comments.

American Lands ALLIANCE

Jim Jontz,
Executive Director

Daniel Hall,
Director, Forest
Biodiversity Program

Phone: 503-978-0511
Fax: 503-978-1757
E: wafcfbp@teleport.com

5825 North Greeley Ave.
Portland, OR 97217

www.americanlands.org

I. Overarching Issues

Depending on how the policy standards for CCAs/ESPs are interpreted, those standards might provide the covered species with a lesser chance of recovery than when the standards for HCPs/ITPs are properly implemented. It is not clear, for example, whether CCAs must minimize and mitigate the impacts of "take" to the maximum extent practicable, as is required for HCPs, nor is it clear whether CCAs are required to provide measures sufficient to amount to species' recovery, as is also required by the ESA for HCPs/ITPs.

To guard against the possibility that Simpson is proposing to use a CCA/ESP to avoid meeting important (though often insufficient) HCP standards, Simpson's proposed CCA/ESP should be explicitly required to meet all policy standards required for HCPs/ITPs, including those listed in Section III of our comments. Failure to do so might allow Simpson to circumvent the requirements for covering unlisted species in an HCP, including the overarching, Congressionally-mandated requirement that those species be addressed as if they were already listed. (It should also be noted that while it may be beneficial to address unlisted species in an HCP, the species should not be included in the ITP *per se* until such time as the species are listed and other requisites are met, as discussed in Section III of our comments.)

Moreover, the EIS should fully assess the impacts of any differences in the policy standards for HCPs/ITPs and CCAs/ESPs, any subsequent gaps between Simpson's proposed CCA conservation measures and those measures that would be required of an HCP, and any subsequent impacts to the unlisted species' chances of recovery.

The proposed actions' impacts on the covered species' existing and likely-to-be-designated critical habitats must also be carefully examined, since the proposed HCP/ITP (or CCA/ESP) may not be legally issued if it adversely modifies the species' critical habitats, as per ESA s. 7(a)(2). The logging, site preparation, roading, chemical applications, other operations likely to be permitted by the HCP/ITP and CCA/ESP are likely to adversely modify and seriously impact critical habitat for several of the covered listed species, as discussed in Section III of our comments below.

II. Basic Goals and Standards for the EIS

The EIS should meet each of the following goals and standards.

Alternatives Analysis

Under NEPA, an EIS must "rigorously explore and objectively examine all reasonable alternatives." [40 CFR 1502.14(a).]

Under NEPA, where economic preferences are used to select the preferred alternative, the decision must not be based on misleading, biased, or incomplete economic information. [*Seattle Audubon v. Lyons* (871 F. Supp. 1291, 1324 (W.D. Wash. 1994), aff'd 80 F.3d 1401 (9th Cir. 1996), as cited in Arum (1998)]

The existence of a "viable but unexamined alternative renders an environmental impact statement inadequate." [*Alaska Wilderness Recreation & Tourism v. Morrison* (67 F.3d 723, 729 (9th Cir. 1995), as cited in Arum (1998)] Likewise, an agency may not "consider only those alternatives with [the same] end result." [*Resources Ltd. v. Robertson* (35 F.3d 1300, 1307 (9th Cir. 1994), as cited in Arum (1998)]

The EIS must analyze in detail, and evaluate the comparative merits of, a range of several different alternatives for protecting old growth, late seral and riparian ecosystems and species dependent on such ecosystems. All alternatives selected for detailed analysis must *avoid or substantially reduce* the significant environmental impacts of the proposed project. (40 C.F.R. § 1502.14; 14 Cal. Code Regs. § 15126(d).) Thus, a "straw man" alternative which authorizes more timber harvesting than the HCP will not satisfy the agencies' obligations under NEPA and CEQA. The alternatives analysis also should not be constrained by what the applicant deems economically "practicable" or "feasible." (*See* HCP Handbook, p. 3-35.)

The "no action" alternative must accurately describe baseline conditions and assume full compliance with and enforcement of existing federal and state laws. A no action alternative that assumes minimal or compliance with or enforcement of the ESA, and therefore seriously overestimates the purported "benefits" of the HCP's mitigation program, is not acceptable. The no action alternative must account for the likelihood that currently imperiled species will be listed in the future and subject to ESA restrictions.

At a minimum, the following alternatives should be identified and fully studied:

1) A credible "no action" alternative that assumes full "take" avoidance, including in compliance with ESA rules that are consonant with the covered species' recovery needs, such as is required of ESA s. 4(d) rules. Such an alternative would recognize Simpson's responsibility to protect what little habitat remains for endangered species within the context of its much larger ownership, and the fact that Simpson has already profited substantially by harming imperiled species and their habitats.

2) A recovery-oriented HCP that fully meets all goals and standards for HCPs/ITPs, as discussed in Section III of our comments. Among other things, such an alternative would use longer timber rotations, habitat reserves, and site protections to provide both habitat for sensitive species and reasonable income for the landowner. Forests managed for older, more diverse timber stands can provide competitive revenues from higher-quality, higher-priced timber, edible mushrooms, harvest of medicinal plants, clean water, sequestration of atmospheric carbon, and other non-timber forest products and ecosystem services. Timber companies with publicly-owned stocks that are concerned about leveraged takeovers that

may result from restoring their timber inventories may dedicate conservation easements to restrict timber harvests to sustainable levels.

3) Simpson's proposed HCP/ITP and CCA/ESP.

4) In conjunction with each of the preceding alternatives, funding for habitat restoration measures to be secured from other major California timberland owners who have benefitted financially from industrial forestry and the degradation of salmonid habitat. Such funding would be in addition to funding from Simpson and any other sources.

Impacts Analysis -- Independent Analysis

The Services must take a "hard look" at the environmental consequences of approving an action, i.e., an ITP/HCP. [*Kleppe v. Sierra*, 427 U.S. 390, 410 n.21 (1976).]

The EIS must independently evaluate the effectiveness of all HCP components and outcomes. To date, most NEPA documents for forest HCPs simply reiterate the rationale for the plan found in the HCP (which is usually drafted by the landowner's consultant), and do not provide any additional, objective information. Some HCPs even use the same document as both the HCP and the NEPA analysis. An EIS that simply paraphrases or otherwise reiterates the discussion in the HCP, or is artificially constrained by the assumptions and conclusions in the HCP, will be insufficient to meet the agencies' obligations under NEPA.

Contractors for NEPA documents need to be selected by the Services. Moreover, the contractors should not have a financial or other interest in the outcome of the project. [See section 1506.5(c) of the NEPA regulations.] The HCP Handbook also states that the Services are responsible for drafting the NEPA document. [USFWS *et al* (1996), p. 2-4.] The EA or EIS should be developed by an objective third party, i.e., either a NMFS or USFWS office separate from the office which is negotiating the ITP with the landowner, or a consultant other than the consultant hired by the landowner to develop the HCP or other major projects for the landowner.

Independent (and presumably, academic) scientific peer review panels should be consulted during HCP development, particularly for more significant plans. [Kareiva et al (1999)]

Impacts Analysis -- Basic Scope

Under NEPA, environmental impacts which must be considered include impacts to ecological, aesthetic, historical, cultural, economic, social, and health values, including direct, indirect, and cumulative impacts. [Mueller *et al* (1997).] The HCP Handbook also states that impacts to air quality, water quality, and land use patterns should be addressed. [USFWS *et al* (1996), p. 1-6]

Impacts to all other environmental values should be assessed.

Off-reservation American Indian treaty rights must be considered, including through consultation with the relevant tribes, according to the HCP Handbook. [USFWS et al (1996), p. 3-9]

Impacts Analysis -- Activities Examined

The EIS must fully assess the impacts of each forest management activity (i.e., specific types of logging operations, site preparation operations, road construction plans, specific herbicide applications, specific silvicultural regimes and resulting forest growth, etc.) permitted by the ITP and ESP on all environmental resources, including water quality, air quality, watershed and geologic impacts, land use, etc.

In order to adequately evaluate the impacts of the HCP on water quality, the EIS must include adequate baseline data which specifically describes the habitat structure and quality of all Class I, II and III streams in the HCP area. This includes stream temperature, sedimentation and turbidity, percentage of shade canopy, and the location, quality and quantity of large woody debris, spawning gravel, riffles, pools, fish spawning and rearing sites, and key forest plant and animal species. All Class I, II and III watercourse, roads, road crossings, landings and skid trails must be described and mapped. In addition, the EIS must identify the steepness, stability and erosion hazard rating of slopes, and the location of any previous slope and road failures, erosion and mass wasting incidents. The EIS also must assess and map upslope activities that would potentially deliver sediment to streams and are potential sources of slides, erosion and mass wasting.

The EIS must analyze impact of the HCP on each of these baseline parameters, including stream sedimentation, temperature and turbidity; canopy retention; recruitment of large woody debris; late seral forest characteristics of stream corridors; and wildlife and vegetative structure and diversity, both during harvest and over the long term. The EIS must examine the impact of construction and maintenance of roads, road crossings, landings and skid trails, wet weather operations, operations on steep slopes and near watercourses, and the ability of culverts to accommodate projected and unanticipated storm events.

The EIS also must evaluate the impact of timber harvesting and other activities authorized by the HCP on the ability of Class I, II and III streams in the HCP area to meet applicable basin plan limitations, water quality objectives, total maximum daily loads, and antidegradation requirements over the life of the HCP. Finally, the EIS must evaluate the adequacy of the HCP's mitigation measures, such as leave tree standards, stream buffers, canopy retention and recruitment of large woody debris to offset the adverse impacts of the HCP.

The details of HCP mitigation measures must be explicitly described and accompanied by data on their effectiveness. The likely success of each measure must be evaluated, as must the overall effectiveness of mitigation measures at minimizing and offsetting "take." [Kareiva et al (1999)]

Impacts Analysis – Species Impacts Analysis

The EIS must include a detailed biological analysis of the impacts of timber harvesting, resource extraction and other activities authorized by the HCP and ITP on *each* wildlife and plant species (whether listed or unlisted) to be "covered by" the HCP (i.e. each species for which "no surprises" regulatory assurances will be given) and all designated critical habitat areas. (HCP Handbook, pp. 3-12, 3-38, 4-4.)

Impacts to all threatened, endangered, candidate, proposed-listed, sensitive, rare, endemic, or otherwise at-risk or ecologically, socially, or economically important plant and animal species should be assessed, *regardless* of whether those species are officially "covered" by the HCP.

Impacts should be assessed explicitly for each listed and unlisted species covered by the HCP, as should the relationship between the landowner's forest management practices and each species' conservation needs, including the species' recovery needs.

In addition, the EIS must analyze the impact of activities on all species "occurring or potentially occurring" on all Simpson lands subject to the HCP, regardless of whether they will be "covered" by the HCP. If any wildlife or plant species occurring or potentially occurring on lands subject to the HCP will *not* be "covered" by the plan, the EIS must analyze the impacts of the HCP on these species, why they are not "covered," and include mitigation measures for any significant impacts identified.

The HCP Handbook notes that the Services must consider impacts on Federally-listed plants, during ESA s. 7 consultation, regardless of whether those plants are "covered" by the HCP. Plants protected by state laws are among those which must be addressed, pursuant to ESA s. 9. [USFWS et al (1996), pp. 1-6, 3-8, & 3-17]

Determinations of which species are likely to be using the property should be based primarily on field surveys. It is not safe to assume that past land management eliminated all sensitive species and their habitats, or on state species databases, which are notoriously inadequate for private lands. Determinations about species which will need habitats to be restored on the property for their recovery should consider the site's potential natural habitats, based on soils, potential vegetation, elevation, local climate, etc.

For each species, the analysis must: (1) specifically indicate how the HCP and ITP will affect species' survival *and* recovery prospects; (2) describe activities that may result in take of covered species; and (3) *quantify* the anticipated level of take resulting from all activities authorized under the HCP. (HCP Handbook, pp. 3-12 - 3-14, 3-20.) The EIS must indicate whether the impacts of the HCP and ITP on each of these species will be significant, and if so, include *species specific* mitigation measures and management actions for *each* significant

impact identified. (40 C.F.R. § 1502.16(h).) Generalized habitat based mitigation measures which do not account for individual species needs are unacceptable.

The EIS must provide: 1) detailed, thorough, and quantitative descriptions of the habitat and population conditions that will correspond to each covered species' recovery, 2) detailed, quantitative habitat and population projections for each species covered by the HCP, for each alternative, and 3) compare the alternatives' outcomes identified in step (2) with the indicators of recovery identified in step (1).

HCPs -- particularly those covering large areas or large amounts of a species' range -- should inventory, summarize, and document available data on each species and their distribution, abundance, population trends, ecological requirements, life history, and causes of endangerment. [Kareiva et al (1999)]

Quantitative estimates of the impacts of "take" on species' viability should be provided, especially for larger or more significant plans. At a minimum, best and worst-case scenarios should be identified. [Kareiva et al (1999)]

Impacts of "take" should also be evaluated, particularly for larger or more significant plans, including by determining whether the habitats being "taken" correspond to population "sources" or "sinks," whether genetically unique subpopulations are being "taken," and whether unique habitat/species combinations are being impacted. [Kareiva et al (1999)]

HCPs need to quantify the plans' biological goals. [Kareiva et al (1999)]

An HCP's adequacy is questionable if the plan fails to adequately address one or more of the following: species' status reviews, analyzing the proposed "take," assessing the impacts of "take," planning and assessing mitigation measures, and planning and assessing monitoring provisions. [Kareiva et al (1999)]

Where possible, assertions made in HCPs should be supported by quantitative information. [Kareiva et al (1999)]

The EIS likewise must objectively analyze the likely short-term *and* long-term effectiveness of each of the HCP's proposed measures to minimize and mitigate incidental take of covered species and provide a scientifically justifiable reason why and how these measures will mitigate any significant adverse impacts to species to a level of insignificance. (HCP Handbook, p. 3-19.)

The analysis in the EIS must be supported by accurate and adequate baseline data (including field surveys), scientific studies, population viability analyses, and other information which provides a scientifically justifiable basis for the environmental document's conclusions. Specifically, the EIS must include comprehensive biological assessments for each covered species (and particularly listed species), and their associated habitats. Such assessments should

address such issues as species abundance and distribution, habitat requirements (e.g. important food sources and foraging habitat, and nesting, roosting and dispersal habitat), biologically important symbiotic relationships with other species, life history and population trends, both range-wide and within the plan area.

Impacts Analysis – Cumulative Impacts

Cumulative effects analyses are also required as part of the ESA s. 7 consultation process for HCPs, as per 50 CFR 402. HCPs should evaluate the cumulative impacts of multiple plans and their interactions. The percentage of local *and* global populations that will be "taken" should be assessed. [Kareiva et al (1999)]

A thorough cumulative effects analysis should be conducted to address all Federal and non-Federal actions affecting each species covered by the ITP/HCP. The analysis should also address all past, present, and reasonably foreseeable actions across the species' ranges.

The cumulative impacts of the HCP also must be evaluated in conjunction with the anticipated impacts on all species affected by the HCP of ESA section 4(d) rules for the covered species, the effects of public lands management activities under the Northwest Forest Plan, and the impacts of timber harvesting under the "salvage logging rider" (Pub. L. No. 104-19, section 2001 (1995)) and other relevant laws and policies. Further, the cumulative impacts analysis must also evaluate the HCP's and ITP's impact on the effectiveness of existing federal and non-federal conservation strategies over the short term and the long term.

The EIS must evaluate the cumulative impacts of timber harvesting and other land-disturbing activities on each species affected by the HCP. This cumulative effects analysis must account for the amount of incidental take of species authorized by each incidental take permit and incidental take statement that has been approved or is currently being prepared for federal and non-federal lands throughout the Pacific Northwest (e.g. California, Oregon and Washington). The analysis should also account for the possibility that landowners who have not yet applied for an incidental take permit to take existing habitat and species on private lands will do so in the future, and estimate the amount of incidental take that will be authorized by those permits in light of existing precedents.

Impacts Analysis – Institutional Issues

The EIS must objectively and independently evaluate any assertions by the HCP applicant that certain mitigation measures are "impracticable" or "infeasible." Such assertions must be supported by reliable and specific documentation of impracticability or infeasibility. (HCP Handbook, p. 7-3.)

Activities on other lands not subject to the HCP's Implementation Agreement should be considered as speculative, and not counted as mitigation for "take" authorized by the ITP.

The EIS must analyze the adequacy of the commitments for funding the mitigation and monitoring measures in the HCP to support long term species conservation. The analysis must include financial and other data, which accounts for inflation, depreciation of assets, increased real estate values, and other contingencies, to support the conclusions reached. If the EIS concludes that the funding mechanisms are inadequate, it must propose alternate funding mechanisms which would achieve long term conservation of species for the life of the permit.

The EIS must analyze the reasonably foreseeable biological impacts of including a "no surprises" provision in the HCP and implementing agreement. The effects of the "no surprises" policy over both the short and the long term are extremely likely to be significant. Thus, if 1) the HCP fails to achieve its stated goals, 2) the HCP conditions prove inadequate to protect species, 3) new scientific information is discovered which affects the assumptions in or conclusions of the HCP, and/or 4) unanticipated circumstances significantly change the environmental baseline, then federal and state agencies may be restricted in their enforcement and ability to respond in order to conserve the species.

The EIS should evaluate the availability of federal and state funds to meet any future mitigation requirements. If the availability of federal and/or state funds is a likely possibility, then the EIS must also analyze the biological effects resulting from the permittee's and/or the government's future unwillingness or inability to provide adequate mitigation or HCP implementation funding on Fish and Wildlife Service determinations pursuant to Section 7.

The EIS should fully analyze the impacts of both foreseeable and unforeseeable changed circumstances on the assumptions, conclusions and mitigation measures contained in the HCP, and how these changed circumstances will affect species survival and recovery, population trends, habitat quality and quantity, water quality, and other environmental factors. Foreseeable circumstances include fire, flood, lightning, disease and other stochastic events. The HCP must contain mitigation measures to address such foreseeable circumstances, and specific, detailed procedures to address any unforeseen circumstances, as required by the ESA and its implementing regulations. These critical provisions cannot simply be passed off as a federal government obligation under the "no surprises" policy.

The DEIS must also consider the significant economic benefits that Simpson will likely accrue by acquiring a valid ITP for various listed and unlisted species. Particularly when coupled with "No Surprises" guarantees, the ITP provides a level of regulatory certainty which is unprecedented in the business world, largely insulates Simpson from any future liability to adopt additional conservation measures to protect and recover listed and unlisted species, and may even increase Simpson's land values, assuming that the ITP and HCP could be potentially transferred or otherwise adopted by subsequent landowners.

Information on listed species, as well as monitoring data from HCPs should be made accessible in a centralized location, to facilitate better planning and plan evaluation. [Kareiva et al (1999)]

Mitigation Measures

Mitigation measures should be provided for *each* significant impact under NEPA. [40 CFR 1502.16(h).]

III. Additional Suggestions for the Recovery-Oriented HCP Alternative; Additional Information for the EIS' Impact Analyses

The EIS should also include, in addition to the preferred alternative, which is likely to inadequately address key goals and standards for HCPs, an alternative which fully meets the following goals and standards for HCPs. As discussed above, CCAs should also meet all of the following goals and standards expected for HCPs.

Many of the following goals and standards are also directly relevant to the EIS' impact analyses.

Use of Best Available Science

ESA section 7(a)(2) and the Act's administrative rules require agencies to use the best available science. [16 USC 1536(a)(2).]

The HCP must address the covered species' including population levels, specific habitat conditions, specific ecosystem interactions, and other factors needed for the species' recovery.

The HCP and DEIS must assess and mitigate the impacts of all forest management activities, which may include site preparation; herbicide applications; fertilizer applications; pesticide applications; intrusion of invasive exotic plants and other species as a result of intensive logging practices; intensive short-rotation clearcut forestry practices; frequent and widespread vehicle use and human disturbance; high road densities; and other sources of impacts.

The HCP must address all influences on salmonid habitat related to the covered activities, including invertebrates and other food sources, pollution from herbicides and other chemicals, impacts of herbicides and other chemicals on upslope riparian areas and thus downslope aquatic ecosystems, the impact of upslope logging and other practices on the timing and intensity of water flows, and various other factors.

The HCP must include specific measurable and verifiable performance standards and indicators, including with regard to water temperature, sediment, chemical pollution, invertebrates and other food sources, high and low summer and winter water flows, road densities, and other factors affecting the survival and recovery of the covered species.

The NMFS regulations state that HCPs must describe the status, distribution, seasonal distribution, habitat needs, feeding habitat, and other biological requirements of affected species or stocks. [50 CFR 222.22(b)(3).]

Identification of Biological Goals for the Species

The HCP must also meet, with regard to each of the listed and unlisted species proposed to be covered by the ITP and HCP, the following standards from the Services' "Draft Addendum to the Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process." [Federal Register, 64;45, March 9, 1999.] As discussed below under Sections II-B, C, D, and E of our comments, the following biological goals must correspond to full mitigation of impacts to the species, minimization and mitigation of impacts to the maximum extent practicable, and species' recovery needs, and other basic impact minimization and mitigation standards.

"In the future, every HCP will include specific biological goals and objectives...." "The biological outcome of the operating conservation program for the covered species is the best measure of the success of an HCP." "Specific biological objectives are subsets of the biological goals and represent specific measurable targets for achieving the goals of the operating conservation program." The HCP must include specific measurable outcomes and targets, in terms of populations, reproduction, specific habitat components, specific impact levels which will be considered tolerable, etc., for most covered species.

"Although the goals and objectives may be stated in habitat terms, each covered species that falls under that goal or objective must be clearly specified."

"The biological goals and objectives should be commensurate with the specific impacts and duration of the HCP applicant's proposed action."

"Available literature, State conservation strategies, candidate conservation plans, draft or final recovery plans or outlines, and other sources of relevant scientific and commercial information can serve as guides in setting biological goals and objectives. Species experts, State wildlife agencies, recovery teams, and/or scientific advisory committees may also help develop the biological goals and objectives."

The Services' HCP Handbook states that: i) "habitat based" HCPs should use indicator species to establish forest management parameters, and ii) all endemic, sensitive, listed, proposed listed, candidate, and species of special concern should be addressed "adequately." [USFWS et al (1996), pp. 3-12, -37]

Sierra Club et al v. Bruce Babbitt et al found that current data on species' conditions and recovery needs must be used; goals included in recovery plans are not sufficient if conditions have changed since those plans were written. [Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

Impact Assessment

The NMFS regulations state that HCPs must describe the proposed activity, including the anticipated dates, duration, and specific locations. [50 CFR 222.22(b)(4).]

The NMFS regulations state that HCPs must describe the ITP/HCP's anticipated impacts, including the amount, extent, and type of "take," as well as the anticipated impact on habitats and the likelihood of habitat restoration. [50 CFR 222.22(b)(5)(i) & (ii).]

Sierra Club et al v. Bruce Babbitt et al recently found that HCPs need to determine how many individuals of affected species will be "taken," how many individuals will remain, what the distribution of the species is throughout its remaining habitat, and how this relates to the species' minimum viable population. [Civil Action No. 97-0691-CB-C, Order August 4, 1998, S. Dist., AL, S. Div.]

Likewise, the HCP and DEIS must identify accurate baseline trends (i.e., the "No Action" alternative) which consider the likelihood that the various covered yet-unlisted would be listed in the near future, with various habitat protection measures being required *in lieu* of the HCP. Without accurate baseline trends it is impossible to determine whether the plan provides a net benefit -- or even adequate mitigation -- to the covered species over time. While the exact parameters of these improved measures may not yet be known, it would be quite simple for the HCP and DEIS to identify the likely range of enhanced policy standards that will be adopted by the USFWS, NMFS, and other relevant agencies.

Equally important, for all of the covered species, the HCP and DEIS must identify, describe, and/or quantify the "residual" impacts that the covered species will experience -- including in relation to their survival and recovery needs -- *after* the HCP's impact minimization and mitigation measures have been accounted for.

Effects on proposed listed species, federally listed plants, and critical habitat are to be considered during the ESA s. 7 consultation process. [USFWS et al (1996), p. 6-15, and 16 USC 1536(a)(2).]

ESA s 7 requires consideration of cumulative and indirect effects. [50 CFR 402.] NEPA also requires a cumulative effects analysis.

According to the HCP Handbook, the Services may not be able to approve an ITP under ESA s. 7(a)(2) unless the HCP addresses *all listed species* in the plan area. [USFWS et al (1996), p. 3-7] Presumably this includes federally listed plants, which must be considered during the ESA s. 7 consultation process.